

Claims

- [c1] 1. A dual mode liquid crystal display device, comprising:
an upper substrate;
a lower substrate comprising a first thin film transistor, a second thin film transistor, a reflective electrode connected to the first thin film transistor, and a regional light-emitting source connected to the second thin film transistor ; and
a liquid crystal layer between the upper substrate and the lower substrate.
- [c2] 2. The display device of claim 1, wherein the upper substrate further includes:
a substrate;
a color-filtering array on one surface of the substrate;
and
a first transparent electrode on the surface of the color-filtering layer.
- [c3] 3. The display device of claim 2, wherein the device further includes a polarizer plate and a quarter wave plate on a substrate surface just opposite the color-filtering array.

- [c4] 4. The display device of claim 1, wherein the regional light-emitting source includes a light-emitting diode.
- [c5] 5. The display device of claim 4, wherein the light-emitting diode further includes:
a cathode on the lower substrate;
a light-emitting layer on the cathode; and
a second transparent electrode on the light-emitting layer, wherein the second transparent electrode serves as an anode.
- [c6] 6. The display device of claim 1, wherein the reflective electrodes is set up on a bumpy layer.
- [c7] 7. The display device of claim 1, wherein the first thin film transistor and the reflective electrode are formed in a first pixel region, and the second thin film transistor and the regional light-emitting source are formed in a second pixel region.
- [c8] 8. The display device of claim 1, wherein the first thin film transistor, the reflective electrode, the second thin film transistor and the regional light-emitting source are formed in a pixel region.
- [c9] 9. A dual mode liquid crystal display device, comprising:
a lower substrate;
an upper substrate having a first thin film transistor and

a first transparent electrode electrical connected to the first thin film transistor , a second thin film transistor and a regional light-emitting source electrical connected with the second thin film transistor; and
a liquid crystal layer between the upper substrate and the lower substrate.

[c10] 10. The display device of claim 9, wherein the regional light-emitting source includes a light-emitting diode.

[c11] 11. The display device of claim 10, wherein a portion of the first transparent electrode serves as an anode for the light-emitting diode and the light-emitting diode further includes:

a light-emitting layer on a surface of the first transparent electrode facing the lower substrate; and
a cathode on the light-emitting layer facing the lower substrate.

[c12] 12. The display device of claim 11, wherein aside from the first transparent electrode and the first/second thin film transistor on the substrate of the upper substrate, further includes:

a quarter wave plate on one surface of the substrate; and
a polarizer plate on the quarter wave plate.

[c13] 13. The display device of claim 9, wherein the lower sub-

strate further includes:

a substrate;

a bumpy layer on one of the substrate surface;

a reflective layer on the bumpy layer;

a color-filtering array on the reflective layer;

a second transparent electrode on the color-filtering array.

[c14] 14. The display device of claim 13, wherein the reflective liquid crystal display device serves as the principal display device when the background light intensity is strong and the regional light-emitting source serves as the principal display device when the background light intensity is weak.

[c15] 15. A dual mode liquid crystal display device, comprising:
an upper substrate having a first transparent electrode and a regional light-emitting source electrical connected to the first transparent electrode;
a lower substrate having a second electrode; and
a liquid crystal layer between the upper substrate and the lower substrate.

[c16] 16. The display device of claim 15, wherein the regional light-emitting source includes a light-emitting diode.

[c17] 17. The display device of claim 16, wherein a portion of the first transparent electrode serve as an anode for the light-emitting diode and the light-emitting diode further includes:

a light-emitting layer on a surface of the first transparent electrode facing the lower substrate; and
a cathode on the light-emitting layer facing the lower substrate.

[c18] 18. The display device of claim 15, wherein aside from the first transparent electrode and the first/second thin film transistor on a substrate of the upper substrate, further includes:

a quarter wave plate on one surface of the substrate; and
a polarizer plate on the quarter wave plate.

[c19] 19. The display device of claim 15, wherein the lower substrate further includes:

a substrate;
a bumpy layer on one of the substrate surface;
a reflective layer on the bumpy layer; and
a color-filtering array on the reflective layer, wherein the second transparent electrode is on the color-filtering array.

[c20] 20. The display device of claim 15, wherein the reflective liquid crystal display device serves as the principal dis-

play device when the background light intensity is strong and the regional light-emitting source serves as the principal display device when the background light intensity is weak.